Toward Human-Centered Innovation

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Introduction

In regard to efforts on accelerating innovation—and particularly the project on Innovation's Vital Signs—there should be a greater focus on *human-centered innovation*, for at least two reasons. First, change and innovation are not desirable ends in themselves; in fact, some innovation is evidently wasteful and even destructive. Second, while further research is needed to determine the detailed nature of the trend, current business news strongly suggests that the leading edge of innovation today is increasingly driven by human-centered design.

This trend challenges much of the conventional wisdom underlying both public-sector and private, philanthropic efforts to promote innovation as a general economic good. Such efforts in many cases should be re-thought and adjusted to account for more than just the inputs to innovation, or the gross level of resulting innovation activity. Rather, initiatives to promote innovation need to assess and consider the net social value of the resulting outcomes.

Defining 'Human-Centered' Design and Innovation

Innovation traditionally was viewed as a linear process: from basic research to technology development and on to test/evaluation, demonstration, deployment, commercialization, and ultimately, market penetration. And perhaps, if successful, market saturation, obsolescence, and finally replacement. Human (and social) factors—needs, desires, demands, behavior—were considered either not at all or intuitively, anecdotally, coincidentally, mechanically, and often reactively. Innovation was driven, first, by hard science, engineering, and production, with marketing and sales trailing behind like army camp followers.

Potential new products would emerge serendipitously from exploratory R&D. Marketing would speculate on potential customers. Promising candidates for commercial products would be subjected to test markets to see if consumers would accept and demand them. If so, full-scale production and marketing would follow.

For well-known reasons we need not belabor here, that linear process was thrown topsy-turvy in the past quarter century or so as information technology both empowered consumers and hugely boosted the speed, agility, and volatility of design, production, and market processes. Two relevant artifacts

of that market revolution have been the ascendance of personalization and of ever more intimate, nuanced, customer-supplier relationships.[1]

The "New Coke" fiasco of 1985 may be as good a symptom as any to mark the watershed between the old producer-centered (production push) model of innovation and the new age of human-centered (not just demand-pull but people-pull) form that increasingly drives the global marketplace.

An important lesson from the New Coke innovation blunder is that it did not result simply from ignoring consumers. Indeed, the introduction of New Coke followed market research showing that Pepsi was gaining market share from Coke because a new generation of consumers preferred the sweeter taste of Pepsi. And blind market tests in fact indicated that a larger share of soft drink consumers liked the greater sweetness of the New Coke formulation than the drier flavor of the old Coke recipe.

But New Coke was rejected after its full-scale market introduction, and not just with disinterest but with anger bordering on outrage.

What the old, mechanistic and reactive form of market research had failed so ingloriously to anticipate was that Coca-Cola was not just something to drink but an important, almost sacred cultural icon.

Human-centered design and innovation, in contrast, do more than replace the simple linear model of innovation with the more elaborate web of the innovation ecosystem the Center for Accelerating Innovation has charted—they put human and social imperatives first and foremost. Moreover, they do not limit human factors to ergonomics and economic utility, but give acute attention to culture, meaning, and behavior.

While human-centered design appears to be pushing the leading edge of innovation today, it has deep historical roots. The basic conception of human-centered technical design began with the discovery of the "learning curve" in the 1920s, and then serially evolved through the development of "sociotechnical system design" at the Tavistock Institute in the 1950s, E.F. Schumacher's concurrent initiatives for "appropriate technology," and, later, movements for "total quality management" and "business process reengineering." While varying in focus and application, the essential theme of these challenges to Taylorism's mechanistic idiom of innovation was well expressed by the subtitle of Schumacher's popular book on small-scale systems: "Economics as if people mattered."

The current expression of human-centered innovation can be observed in the work of leading commercial design firms, which characteristically begin projects with exhaustive study of human and social factors before any technical designs are plotted. One example is the Opti Desktop PC, which won a gold award for China's Lenovo Group and its American design partner ZIBA Design in the latest annual industrial design excellence competition co-sponsored by *Business Week* and the Industrial Designers Society of America.

The team's design research, *Business Week* reported, was "dubbed 'Search for the Soul' of the Chinese customer," and aimed to help Lenovo compete on something more than just price. "Lenovo and ZIBA delved deeply into Chinese consumer culture to 'find out which design elements have meaning and value for specific groups of Chinese consumers'…. [They] spent months immersed in Chinese music, history, and objects of desire, such as cell phones, observing families as they lived, worked, and played." At the end, the team had identified five distinct 'technology tribes' in China

[1] Government innovation—that is, R&D by government for government acquisition—continues to follow a process largely insulated from market dynamics, driven by political demands and often turgid bureaucratic procedures that commonly are even more isolated from human user, organizational, and cultural engagement or considerations.

and designed the Opti for the "Deep Immersers who seek escape through immersing themselves in games online."[2]

Innovation for What?

Mere boosterism may be satisfied with an agnostic notion of innovation—indifferent to innovation's actual consequences as long as they stimulate economic activity. But if value-free innovation is the benchmark for Innovation's Vital Signs, it follows that 'clusters' of global terror and criminal networks, such as Iraq's insurgents, are among the world's leading models of 'best practices.' As blogger John Robb reports:

> *Iraq's insurgency is a cooperative community arrangement between many diverse groups that operates much like open source development in the software industry. As an adjunct to this cooperative arrangement, micro-markets have formed around the arming and prosecution of specific forms of attack. These micro-markets enhance innovation, participation, and skill development.*
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> *The best example of this is in the building and emplacement of IEDs[3], where guerrilla entrepreneurs have formed cells for hire that specialize in certain aspects of the IED operations chain (the IED, or homemade bomb, has become the weapon of choice for Iraqi guerrillas fighting US soldiers).*[4]

This won't do. The metaphor of 'vital signs' derives from the medical quest to save lives and improve health. Yet medical practice itself continues to be dogged by the nemesis of iatrogenic illness—the cure that is more destructive than the disease it aims to treat.

Health care reformers increasingly are attempting to redirect programs and practices to focus on tangible evidence of the actual outcomes of treatments and services, rather than just on inputs, intentions, and acquisition of the latest technical inventions. However, generic innovation boosters all too commonly plow ahead in blithe indifference to the ends and consequences of innovation, ignoring such benchmarks in the morbidly rich history of innovation-gone-awry as these:

- Theodore Kaczynski (mathematician), A.Q. Khan (physicist), Ayman al-Zawahiri and Josef Mengele (physicians), Shiro Ishii (microbiologist), and Khalid Shaikh Mohammed, Ramzi Yousef, and Mohammed Atta (engineers), as well as the yet-anonymous crafter of the 2001 anthrax attacks on the United States are just a few stars in the copious rogues' gallery of Richard Florida's "creative class"[5] who applied their innovative intellectual skills to malignant ends.

- Long-Term Capital Management, a hedge fund founded In 1994 with two winners of the Nobel Prize in Economics on its board promised affluent investors that its arcane mathematical models would provide risk-free, extravagant returns. In 1998, the Federal Reserve had to round up a bailout of over $3.6 billion, fearing that LTCM's sudden collapse would spawn a global financial disaster. Enron Corp., founded on a gusher of, if anything, even more breathless technological hubris—promising to replace human-managed commodity markets with exotic automated trading exchanges—blew up in 2001 with even more disruptive economic and legal impacts.

- *The Careless Technology*, a 1972 collection of papers from a symposium on the ecological effects of international development, concluded that the great majority of projects sponsored by development organizations over the previous three decades had done more harm than good—a result of their narrow, technocratic specialization and lack of attendance to broad, ecosystem

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[2] "The Best Product Design of 2006," *Business Week*, July 10, 2006.
[3] Improvised Explosive Devices.
[4] John Robb, "Journal: Iraq's IED micro-markets," *Global Guerillas*, Feb. 14, 2006 (http://globalguerrillas.typepad.com/globalguerrillas/2006/02/journal_more_in.html)
[5] Richard Florida, *The Rise of the Creative Class* (New York: Basic Books, 2002).

impacts.[6] Three decades later, William Easterly, with 16 years of experience as a senior economist at the World Bank, again concluded in two recent books[7] that over a trillion dollars of technocratically managed aid to 'third world' countries had yielded little or no improvement in the lot of the poor, often doing more harm than good—again, for lack of attention to how human ecology actually works.

So there is something more to human-centered innovation than just attending to human factors in production, ergonomics, or market demographics. Or even engaging the 'lead users' Eric Von Hippel celebrates.[8] Those are all good practices, maybe even necessary, but they are not sufficient.

However confounding it may be to innovation planning and metrics, "human-centered" has an implicit connotation of *humaneness*—which in turn demands some value standards to filter 'good' from 'bad' innovation.

Such a requirement does not fit well in the pristine framework of neoclassical economics and the arid econometric tools contrived to inform it—with their agnostic, rationally utilitarian notion of demand. Rather, we need to look to political economy and welfare economics to find ways to manage the human value of innovation.

There we find that managing development according to the value of its impacts and consequences is neither a new problem nor virgin territory. The techniques for doing so have been refined and applied for decades in such fields as environmental protection, resource management, and transportation, workplace, food, and drug safety.

The Trend

Anecdotal indicators suggest imminent decline of the more-of-the-same approach to accelerating innovation, that is: more inputs of money and people to education and training and to R&D; gauging progress by the gross volume of expense, activity, and intermediate artifacts (publications, patents, product announcements, etc.); and a 'land rush' mentality to stake out and defend sprawling haciendas of intellectual property. Among the limitations to this conventional approach to "innovation policy" *Business Week*[9] and other publications have noted are:

- China and India will increasingly out-compete the U.S. in sheer volume of educational output, producing technically skilled workers who can be employed at a fraction of U.S. wages.
- Because R&D, innovation, and venture capital are all mobile, they increasingly are flowing out toward these lower-cost centers of production.
- Incomes of U.S. college graduates with bachelor degrees actually declined some 8% in the past three years.
- Even though the U.S. has a prominent lead in medical research, for instance, the pharmaceutical, biotech, and medical devices industries have added only 19,000 workers in the past five years.
- With foreigners providing some 40% of the science and engineering graduate students in U.S. universities, expanding subsidies for domestic higher education to some extent simply enhances foreign competition.

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[6] M. Taghi Farvar and John P. Milton, eds., *The Careless Technology: Ecology and International Development* (New York: Doubleday, 1972).
[7] William Easterly, *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics* (Cambridge: MIT Press, 2001) and *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good* (New York: Penguin, 2006).
[8] Eric von Hippel, *Democratizing Innovation* (Cambridge: MIT Press, 2005).
[9] Michael Mandel, "Can Anyone Steer This Economy?" *Business Week* (November 20, 2006).

- Since 2001, the health care sector added 1.7 million jobs to the U.S. economy. The rest of the private sector added none. The information technology sector lost more than 1.1 million jobs.

- Much of the mushrooming U.S. trade deficit may be attributed to borrowing from abroad to pay for the growing costs of health care.[10]

Meanwhile, the specific *quality* of innovation—at the granular microeconomic, community, and even personal levels—seems increasingly to be becoming the definitive factor of competitive advantage. As *Fast Company* recently reported:

> *Design, in short, is becoming an ever more important engine of corporate profit: It's no longer enough simply to outperform the competition; to thrive in a world of ceaseless and rapid change, businesspeople have to outimagine the competition as well. They must learn to think—to become—more like designers…*
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> *Corporate types, by and large, seek to fuel growth by building from bulletproof, reproducible systems; designers generally attempt to do so by imagining something new, different, better.*[11]

The Challenge

The primary challenge to promulgating a more human-centered approach to managing and accounting for innovation then is this:

- Can we encourage innovation that adds *net* social value? That is, whose benefits clearly outweigh its costs?

- At the same time, can we deter—or at least not encourage—innovation that serves malicious ends or that poses grave threats to humanity?

Certainly it is possible to posit various metrics of the social, economic, ecological, ethical, etc. value of diverse activities aimed at fomenting innovation, and of the potential opportunities and threats that they pose. Coming up with indicators that are demonstrably valid, reliable, and usable is a more demanding challenge.

While good intentions alone will not suffice, waiting for—or expecting—a perfect metric solution would be unrealistic. A practical solution is likely to be what Herbert Simon called a 'satisficing' one: not the hopelessly elusive 'best practice' but a program that is adequately on target and open to further refinement.[12]

Inevitably the cautionary lessons of Public Choice theory[13] will come into play: in particular, that 'rent-seeking' special interests invest and compete to steer public, political choices to provide parochial benefits, often at the expense of the general welfare. Indeed, the military-industrial complex whose distorting influence on public investment President Eisenhower warned about half a century ago has sprawled into a broader government-industrial complex that often steers innovation subsidies toward wasteful, anachronistic, or harmful results.

However, the same competitive, globalization trend noted earlier that is driving the imperative for more human-centered innovation is progressively curtailing the ability of national governments to insulate their domestic constituents from the demands of global market forces. The growing power of personalization and 'crowdsourcing'—as in the forms of the blogosphere, citizen journalism, open source systems, or globally networked consumer or civic insurgent cells—already have as much if not

[10] "What's Really Propping Up The Economy," *Business Week* (September 25, 2006).
[11] Roger Martin, "Tough Love," *Fast Company* (October 2006). Emphasis added.
[12] Herbert A. Simon, *Administrative Behavior* (New York: Free Press, 4th edition, 1997).
[13] For an overview, see http://perspicuity.net/sd/pub-choice.html.

more influence on the trajectory of economic development as the Congress and its lobbyist courtiers. In this, von Hippel's observations of the 'democratization' of innovation are certainly germane.[14]

Towards a Strategy

One way to adapt Innovation's Vital Signs to emphasize human-centered innovation (and perhaps to curtail wasteful or destructive innovation) is to start with a management-by-exception approach.

That is, we may start by seeking to identify:

- Glaring *barriers* to human-centered innovation: policies, programs, and practices that discourage detailed attendance to human and social requirements.
- *Worst practices* that drive innovation efforts toward wasteful or destructive outcomes.
- *Warning signs* that innovation efforts are heading toward unintended, undesirable consequences.

While it is easier to identify worst practices (which are demonstrably morbid or lethal in their effects) than best practices (which are nearly impossible to identify unambiguously, are ever mutating, and once codified only assure mediocrity), it may be most feasible to try to identify and track certain *essential* features of human-centered innovation.

For instance, following the ZIBA example mentioned earlier: Programs that engage and invest in ethnographers, anthropologists, and other social and behavioral analysts to study user desires, expectations, behavior, and needs first, and then channel technical design based on the resulting insights, would seem at least more likely to respond successfully to human requirements than programs that simply engineer in a vacuum of social disinterest.

So, a positive corollary to management-by-exception may be to identify some of the essential 'habits' of highly effective, human-centered innovators, as in the approach taken by Jim Collins and Jerry Porras in their research for *Built to Last*.[15]

ISO 'Good' Innovation

Even once we agree about the need to value the outcomes of innovation efforts, we need apt terminology for what we are aiming at. 'Human-centered' served to get our conversation going, but may not be clear enough or get traction. The most practical terminology may just be the simplest.

Getting back to our original premise, obviously, not all innovation is good or desirable. So the essential objective is to filter the good from the bad. That is:

- Reasonable people would prefer to invest in good innovation, and to not invest in or to even discourage bad innovation.
- To do that, one needs standards, criteria, metrics—to discriminate the good from the bad innovations.
- Then, to actually fertilize the good and weed out the bad, one needs to know the "generative factors" in innovation programs, practices, policies, etc. that cause either the good or bad outcomes.

[14] Von Hippel, op. cit.
[15] James C. Collins and Jerry I. Porras, *Built to Last: Successful Habits of Visionary Companies* (New York: HarperCollins, 1997).

- I suggest then that we should describe the goal of our search as either simply "good innovation" or, to be a bit more technical-sounding, "constructive innovation" (as opposed to destructive).

What Is 'Good' Or 'Constructive' Innovation?

Before we get on to metrics, we need to have some defensible, philosophical definition of what we mean by 'good' or 'constructive.' At the moment, there appear to be three evident possibilities:

- Hippocratic = Do no harm.

This seems to me, literally, an ideal standard, but not a very practicable one for our purposes. Even in medical practice, where the adherence to the principle is deeply rooted, modern practice continually (increasingly perhaps) requires making choices between greater or lesser harm in pursuit of doing something good: e.g., using technology to prolong a life afflicted with unbearable pain and suffering vs. assisted suicide, among numerous other examples.

- Progressive = net social benefit = [(benefits - costs) > 0].

As I noted previously, this is the subject of welfare economics, rich in theory, methodology, and experience. This is less idealistic than the Hippocratic standard, but easier to accomplish conclusively in theory than in practice. I won't belabor the reasons here for the distortions of social welfare regulation, but will summarize them with one word: politics.

- Satisficing = pretty good = socially (i.e., politically) acceptable.

Satisficing is Herbert Simon's term for definitely non-ideal, practical choices between 'better' and 'worse.' (In this framework, the 'perfect' is proverbially held up as 'the enemy of the good'—a phrase that is problematical because it often is, conveniently, misapplied to choices that really are not between perfect and good but between good and bad.)

That said, I suggest that the Progressive standard should define our practical goal—because that is how satisficing solutions work in practice. I'm simply noticing a standard axiom of negotiating strategy: Ask for the moon and settle for a meteorite.

Metrics

The substance of our proposed investigation then is, first, identify and evaluate metrics ('vital signs') that discriminate good/bad or constructive/destructive innovations. I'm about to offer an initial list of possible candidates but must note that, to bring the study to a valid conclusion, we need to take a double-barreled approach to distill such a list.

That is, we need to begin by considering candidate indicators—assuming that whatever information each requires actually is available. It should be evident that there are facts about the outcomes of innovation that, if we knew them, would help us discriminate between good and bad, but that we cannot get in practice—either because the data have not been assembled yet, or because they are proprietary or classified or too costly or otherwise not immediately accessible. Nevertheless, since we would hope that further research may eventually stimulate the collection of the needed data, or open up its use for our purpose, we should not exclude potentially valuable indicators at the outset.

The second barrel then will be to assess and note which of the indicators we prefer are immediately available, which can and should be made available in the future, and which may not be practicable for the time being.

That said, here are several possible indicators of good or bad innovation for initial consideration, in no particular order:

- Market penetration (+)—more and faster is an indication of social value.
- J.D. Power rating = customer satisfaction (+).
- Recalls (-).
- Endurance—the proposition being that really great, socially valuable innovations tend to endure in the market for a long time because they are both essential and hard to beat (the wheel, the paper clip, Kleenex, the DC-3). Note that I'm talking about persistence-in-use here, not individual product durability. (+)
- Generations—a corollary to Endurance, but a bit different, is number of generations or versions, an indicator of the capacity for continual improvement to satisfy evolving demand. (+)
- Adaptations—another corollary is adaptation to different uses/applications than what the innovation was originally intended for; more being an indicator of greater social value. (If Generations are vertical, Adaptations are horizontal.) (+)
- Liability claims (-).
- Regulatory sanctions (-). One of these or the latter (liability) may be an anomaly; a slew of them is probably an indicator of something really bad.
- Cost of development—other things equal, a good innovation that costs less to create is better than one that costs more. (Even if other things are not entirely equal, it still might be better.) (+)
- Profitability—again, other things equal, a good innovation that is more profitable is better than one that is less so. Not just because it makes investors/vendors happier but because it provides the fuel for further (good) innovation.
- Abuse/misuse—pseudofed may be a boon for sinus sufferers, but its utility as a feedstock for illicit methamphetamine labs is a bad thing. This is the dark side of the Adaptation force. (-)
- Appropriateness—viz. E.F. Schumacher et al. (+)
- Resource efficiency (+).

Finally, for now, we can throw in these catch-alls:

- Collateral damage (-).
- Collateral benefits (+).

This list is certainly incomplete but may be adequate for now to illustrate the types of indicators we would assess and refine. And we don't need to get far into the second barrel to note at a glance that some of these data are evidently easier to get than others, and some are more concrete than others that are more ambiguous and challenging to measure.

Generative Factors

As I mentioned, to study and analyze the generative factors that enable some innovation programs/organizations/communities to produce 'good' innovations, while others spawn more or less ugly babies, we may learn from the research methodology used by Collins and Porras to produce their hugely bestselling and immensely profitable books, *Built to Last* and *Good to Great*. Broadly, they adapted the classic human psychology technique of studying twins separated at birth.

While that seems to have worked well for them to distinguish the generative factors that distinguish great from mediocre companies, it's not immediately clear how well that might work to differentiate those factors between good/great innovations and mediocre/bad innovations. However, given the success the technique has produced in their widely prized work, it is a research approach worth considering.

There are at least some aspects of their approach that make sense to emulate. First, once we have devised a list of innovation value indicators, per above, we could copy those authors' decision to focus on subjects that had been around long enough to go through a full life cycle of development. Then, just as Collins and Porras surveyed a variety of companies across a spectrum of different industries, we could apply our value vector to a wide variety of types of innovations in diverse markets.

At first blush, it might well be possible to come up with paired twins of innovations 'separated at birth,' as those researchers did with companies, to compare the differentiating factors in the evolutionary paths of the 'good' and 'bad' twin respectively. If so, it could be quite interesting to try.

Still, we must recognize that innovations are different from companies—the latter are discrete entities while innovations are ideas that may be born and developed in several places/organizations at the same time. Intellectual property law, of course, does tie particular innovations to particular persons/companies for some time. But not all good/great innovations historically have been protected that way, and many at least have graduated at some point to the public domain. (It's not clear whether that is necessary to the criterion of a 'full life cycle,' since IP law lately has been stretched in some instances to preserve protection seemingly in perpetuity.)

So, in any case, whatever may come from the twin pairs analysis, we probably also should take a broad list of notable innovations, sort them into 'good' and 'bad' with our value vector, and then do at least a qualitative comparison, attempting to identify one or more hypothetical patterns that differ between the good and bad. To do the latter, we might choose some candidate innovations from each pile for which the history of their creation and development is well documented. At the very least we would produce a valuable collection of case studies. (That might follow the path taken by Peters and Waterman with *In Search of Excellence*,[16] some 25 yrs ago.)

Beyond that, there likely are some more rigorous techniques that could differentiate some the generative factors in those histories.

Conclusion

Early on, the crafters of copyright and patent law recognized that, in an unregulated economy, the creative works produced by inventors, authors, and artists conferred more valuable benefits to the public as a whole than the rewards the creators themselves might receive. They understood that the principal purpose of copyright and patent law was, in the terminology of welfare economics, to *internalize* the positive externalities of innovation—in order to provide an incentive to increase the

[16] Thomas J. Peters and Robert H. Waterman, *In Search of Excellence: Lessons from America's Best-Run Companies* (New York: Harper Collins, 1982).

production of creative works. This is clearly stated in the intent of the "Patent and Copyright Clause" (Article I, Section 8, Clause 8) of the United States' constitution: "…to promote the Progress of Science and the useful Arts, by securing, for limited Times, to Authors and Inventors, the exclusive Right to their respective Writings and Discoveries."

But the Founders—eager to accelerate the economic development of the fledgling republic, and perhaps uplifted with the optimism of the 18th-century Enlightenment—included no explicit provision to internalize the negative externalities of innovation of the sorts noted earlier. Despite occasional social backlash against the costs of technical progress—such as the Luddite rebellion of the 19th century—for the next century and more, the political establishment showed only the most begrudging inclination to accommodate such concerns.

In the past several decades however, Western society and the American political system have embraced, step by step, measures to analyze and modulate the negative impacts of innovation. One milestone along that path was the National Environmental Policy Act of 1969, which required broad assessment and consideration of the costs as well as the benefits of new infrastructure and other public projects.

More recently, the Master Settlement Agreement of 1998 concluded litigation by the attorneys general of 46 U.S. states and six territories aimed at getting the tobacco industry to pay for the negative external costs to public health of tobacco products. Much of the impetus for the latter was in response particularly to longstanding industry R&D efforts—revealed publicly by Dr. Jeffrey Wigand, a former senior scientist at the Brown & Williamson Tobacco Company—to develop product innovations designed to increase addiction to tobacco use.

Today, under the rubric of "Sustainability," a global movement is afoot to expand both the accounting and accountability for the negative and positive impacts of corporate or government products, practices, and innovations. At the heart of this effort is an embrace of so-called "triple bottom line" reporting which supplements traditional profit or economic objective measures with others to indicate, as well, environmental and social benefits and costs. While sustainability indicators are still evolving[17] and imperfect,[18] the exploding interest in triple-bottom-line accounting[19] makes it a key benchmark that would-be auditors of "Innovation's Vital Signs" need to consider.

Overall, focusing the quest for useful indicators of economic progress on *human-centered* innovation should be viewed not as a radical departure but as an accommodation of the major forces driving innovation in today's global economy: the accelerating business trend to designing innovations to serve human requirements first, and the burgeoning demand for transparency and accountability in pursuit of positive, sustainable economic development.

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[17] The Global Reporting Initiative is a collaborative, 'open' effort to further develop sustainability indicators: www.GlobalReporting.org.
[18] See, for example, Wayne Norman and Chris MacDonald, "Getting to the Bottom of 'Triple Bottom Line'," *Business Ethics Quarterly* (April 2004); also http://www.businessethics.ca/3bl/.
[19] Google hits on the phrase "triple bottom line" grew from 15,600 in August 2002 to 187,000 in January 2005, and were over 2.2 million at the time of this writing in May 2007.